

dia. In Assam the genus is quite definitely not confined to the hills. In the plains of Sibsagar Dt. *Delias aglaia* (L.) and *descombesi leucantha* (Fruh) were two of our very common butterflies. They were succession brooded, the larvae feeding, as usual, on *Loranthus* spp. The following species were also taken in the plains from time to time:

agostina (Hew.) Occasional, Sibsagar Dt. and Margherita. Two only from Naga Hills.

hyparete hierte (Hub.) Sibsagar Dt. Not seen in Naga Hills.

thysbe pyramus (Wall). Sibsagar Dt. Not seen in Naga Hills.

As none of these was common in the neighbouring Naga Hills it would be unsafe to conclude without definite evidence of breeding habits that they were merely wanderers from the hills. The common Naga Hills spp. were *belladonna lugens* (Jord.) and *berinda berinda* (M.). These two I never saw in the plains.

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26. DANAID BUTTERFLIES ATTRACTED TO *HELIOTROP- PIUM INDICUM* (BORAGINACEAE), AN ALKALOID CONTAINING PLANT

(With a plate)

While on a survey to locate Bonnet macaque troops around Tulsi lake, on 22nd May, 1974, in company with Mr. P. Kannan, Curator for Animals, Borivli National Park, Maharashtra State, I observed a number of Danaid butterflies (*Danaus limniace* and *Euploea core*) clustered on a *Heliotropium indicum* plant which was in flower. At first I assumed that the butterflies were feeding on the flowers, but closer inspection revealed that all of them were clinging to, and feeding on, a dead and decaying inflorescence drooping from the plant.

On a subsequent occasion, on 4th September, 1974, I noticed 5 *Danaus limniace* hovering around, and intermittently settling upon, some newly flowering branches of a *Heliotropium indicum* growing on the bank of the pond near the offices of the Borivli National Park. I decided to find out whether they could be attracted away from this site to another *H. indicum* plant growing about 8 feet away. I crushed an inflorescence bearing few flowers of this latter plant, sufficient to extract the plant juice without distorting its rigidity, and waited. In a few minutes all the 5 specimens of *D. limniace* transferred their attention

to this plant and within seconds of arrival settled and avidly fed on the bruised portion of the plant. While I prepared to take a colour photograph of this group two more members of the same species joined them, making a total of seven. When I passed by the same path about an hour later a few *D. limniace* (perhaps new arrivals?) and 1 *D. chrysippus* were feeding on it.

A few days later, on 8th September, 1974, accompanied by my wife, I observed the same phenomenon on the road verges near the Aarey Milk Colony. Four specimens of *D. limniace* and four of *D. chrysippus* were feeding on some dead and withered branches of a *H. indicum* plant. I took a black-and-white photograph of this assemblage and observed that inspite of the disturbance we had caused in the area the butterflies repeatedly settled on the same branches to feed, so strongly did they seem to be attracted to this plant. We succeeded in capturing 3 specimens of the *D. limniace* (2 males and 1 female) and 1 specimen of *D. chrysippus* (1 male), determined their sex by examining for presence or absence of abdominal brushes ("hair-pencils") and hind wing pouches, and then released them.

The observations on the apparently unusual feeding behaviour recorded here resemble similar behavioural traits reported in Australian butterflies of the family Danaidae. Edgar, Culvenor and Robinson (1973) have reported from Queensland the attraction of *Danaus chrysippus petilea* (Stoll) to *Heliotropium amplexicaule* which is known to contain pyrrolizidine alkaloids. (Bull, Culvenor & Dick 1968). It has also been reported that Australian adult male danaid butterflies are strongly attracted to, and sometimes feed on, dead and withering plants containing pyrrolizidine alkaloids (Edgar, Culvenor & Robinson 1973). Furthermore, Edgar and Culvenor (1974) have pointed out the remarkable fact that danaid butterflies require pyrrolizidine alkaloids, which they possibly obtain from some of their food plants, and that these alkaloids may undergo metabolic alteration into compounds which are found in the hair-pencils of the abdominal brushes of male butterflies. Their suggestion is based on chemical investigations on extracts of hair-pencils of two species of Australian danaiids. *D. hamatus* (Macleay) and *Euploea tulliolus tulliolus* (Fabricius) both of which contain pyrrolizidine alkaloids in their hair-pencils. It is pertinent too that the male courtship pheromone found in the hair-pencils of the American danaid, *D. gilippus berenice*, has been identified as a pyrrolizidine compound (Pliske & Eisner 1969). A neotropical danaid, *Lycorea ceres ceres*, is also reported to contain a pyrrolizidine compound in its hair-pencils (Meinwald, Meinwald, Wheeler, Eisner & Brower 1966).

Many species of *Heliotropium* found in India contain pyrrolizidine alkaloids, as also plants belonging to the genus *Crotalaria* (Legumin.



Danaid butterflies feeding on withering *Heliotropium indicum* inflorescences.
(Photo: Author)